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Is resilience to climate change socially inclusive? Investigating theories of change processes in Myanmar

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ABSTRACT

Approaches to resilience to climate change can be socially exclusionary if they do not acknowledge diverse experiences of risks or socio-economic barriers to resilience. This paper contributes to analyses of resilience by studying how theories of change (ToC) processes used by development organizations might lead to social exclusions, and seeking ways to make these more inclusive. Adopting insights from participatory monitoring and evaluation, the paper first presents fieldwork from four villages in Myanmar to compare local experiences of risk and resilience with the ToCs underlying pathways to resilience based on building anticipatory, absorptive, and adaptive capacities. The paper then uses interviews with the development organizations using these pathways to identify how ToC processes might exclude local experiences and causes of risk, and to seek ways to make processes more inclusive. The research finds that development organizations can contribute to shared ToCs for resilience, but adopt tacitly different models of risk that reduce attention to more transformative socio-economic pathways to resilience. Consequently, there is a need to consider how resilience and ToCs can become insufficiently scrutinized boundary objects when they are shared by actors with different models of risk and intervention.

1. Introduction

Resilience is now widely discussed within international development as the ability to withstand risks, including those arising from anthropogenic climate change (UNDP, 2014; USAID, 2013). Approaches to resilience, however, are controversial because they reflect, or even legitimize, wider social values and structures (Barrett & Constas, 2014; Brown, 2016; Couzin-Frankel, 2018). Moreover, pathways to resilience might exclude local experiences or causes of risk if they are unaware of their own assumptions, or are not sensitive to diverse stakeholders (Bahadur & Tanner, 2014; Béné, Chowdhury, Rashid, Dhali, & Jahan, 2017).

This paper contributes to the analysis of resilience within environment and development policy by studying the processes used by development organizations to develop, apply, and adapt theories of change (ToCs) for resilience. By so doing, the paper adopts insights from participatory monitoring and evaluation (M&E) to investigate the processes by which development organizations adopt and revise approaches to resilience. Moreover, it contributes to the analysis of ToCs as sites of contestable assumed cause-and-effect and as insufficiently scrutinized boundary objects (Roe, 1991; Star & Griesemer, 1989). Indeed, Brown (2016, p. 71) has argued that the role of resilience as a boundary object within environmental policy needs further research.

The paper presents a combination of fieldwork and interviews relating to development interventions to build resilience in four villages in Myanmar. In particular, it focuses on the frameworks used by the development initiative known as BRACED (Building Resilience and Adaptation to Climate Extremes and Disasters),[1] funded by the United Kingdom Department for International Development (DfID). BRACED is a useful example because it actively seeks to build social capacities to address climate resilience, rather than other initiatives that focus on strengthening infrastructure or managing ecosystems alone. Moreover, BRACED offers the opportunity to analyze diverse ToC processes, based upon program-wide objectives, different pathways to resilience, and the distinctive specialisms of its constituent members.

The research had three objectives. First, to analyze the social inclusiveness of different pathways to resilience by comparing local experiences of risk and resilience in villages with the ToCs underlying each pathway (in particular the research focused on building anticipatory, absorptive, and adaptive capacities as the

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[1] http://www.braced.org/.

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pathways to resilience). Second, to identify the ToC processes, including tacit models of risk and socio-economic transformation, used by development organizations to understand how different pathways were adopted, applied, revised, or left unchallenged. And third, to draw constructive lessons from these studies for making ToC processes and pathways to resilience more socially inclusive.

2. Making resilience inclusive

2.1. Resilience as a contested outcome and boundary object

Resilience is commonly defined as the ability to withstand shocks and risks (Adger, 2000; Brown, 2016). Early definitions of resilience referred largely to physical properties of infrastructure or ecosystems, and especially the stability of physical systems during shocks (Holling, 1973, p. 14; Ludwig, Walker, & Holling, 1997).[2] An increasing number of analysts, however, argue that resilience does not only refer to physical properties of infrastructure or ecosystems, but also to socio-economic factors such as people's ability to access diverse livelihoods, or avoid long-term drivers of social vulnerability (Agrawala & Van Aalst, 2005; Burton, Bizikova, Dickinson, & Howard, 2007; Folke et al., 2010; Folke, 2006; Nelson, Adger, & Brown, 2007). Accordingly, some observers have argued that resilience, and associated concepts such as adaptive capacity, have to be seen in terms of wider social processes of transformational change, which locate concepts of resilience within broader socio-economic change and social values concerning development objectives and appropriate levels of risk (Arora-Jonsson, 2016; Brown, 2016; O'Brien, 2009, 2012; O'Brien et al., 2012; Pelling, 2011; Pelling, O'Brien, & Matyas, 2015).

This social basis of resilience raises a number of conceptual concerns. First, as a socially valued outcome, there is no single pathway to resilience, and approaches depend on local, or deliberatively identified values and circumstances (Levine, 2014; O'Brien & Wolf, 2010; Smith & Stirling, 2010). Indeed, Béné, Frankenberger, and Nelson (2015, p. 7) have drawn from capabilities approaches to development to argue that resilience is effectively a theory of change for achieving wellbeing. It is also possible to adapt previous questions used to define so-called adaptation science (after Smit, Burton, Klein, & Street, 1999): "what" is the objective of resilience? (i.e. which risks); "who" is it for? (or what are the socio-economic barriers); and "how" (how do different options achieve resilience).[3]

Second, frameworks of resilience also imply a tacit model of agency and responsibility for addressing risks. Some critics have used this concern to argue that "resilience," by definition, can fail to interrogate, and even tacitly uphold existing social and economic orders, including neo-liberal world orders (Adger, 2008; Brown, 2016, p. 63; Chandler & Reid, 2016; Rigg & Oven, 2015; Watts, 2015). These worries have also been voiced for other fields of climate policy. Concerning vulnerability assessments, Tschakert, van Oort, St. Clair, and LaMadrid (2013, p. 343) wrote "attention to structural and relational drivers of vulnerability has all but disappeared." Meanwhile, other critics have argued that attempts to build resilience through local initiatives such as community-based adaptation to climate change overstate the homogeneity and agency of communities, and downplay the role and responsibilities of the state and market actors (Dodman & Mitlin, 2013; Forsyth, 2013; Reid & Huq, 2014). These concerns do not dismiss the potential for community involvement in transformational change, but instead imply a need to consider a range of potential pathways to resilience (Ensor, Park, Attwood, Kaminski, & Johnson, 2016; Quandt, 2018).

And thirdly, there are concerns that approaches to resilience can be socially exclusionary if they avoid diverse experiences of risk, or barriers to resilience arising from social and economic structures (Agrawala & Van Aalst, 2005; Burton et al., 2007; Folke et al., 2010; Folke, 2006; Nelson et al., 2007). In particular, approaches to resilience can be exclusionary if they assume that specific pathways are universally beneficial, or if they assume that climatic risks are experienced universally by all stakeholders. Consequently, a more socially inclusive approach to resilience will not equate pathways to resilience with the universal achievement of resilience. But it is also conceptually and methodologically challenging to represent resilience in socially sensitive terms. Indeed, "it is much easier to measure 'objective' events such as rainfall than it is to 'measure' the circumstances which deprive some people of access to irrigation" (Levine, 2014, p. 15; see also: Boyd et al., 2008; Burton, 2009; Lemos & Boyd, 2010; Nightingale, 2017; Ribot, 2010).

Some of these concerns might also be expressed through the debate about resilience as a boundary object. Boundary objects are commonly defined as ideas, tools, or frameworks that are shared by different communities, but which might also be interpreted differently by these groups (Star & Griesemer, 1989). Various scholars in environmental science have argued that resilience is a boundary object because it seeks to integrate social and natural dimensions of sustainability; or because it acts as a communication tool between science and policy (Brand & Jax, 2007; Brown, 2016, p. 3; Olsson, Jerneck, Thoren, Persson, & O'Byrne, 2015). These interpretations of boundary objects emphasize how they offer particular challenges for analysis when they involve different communities of scientists and policymakers, and where scientific analysis of risk and vulnerabilities can be mixed with value-driven policy work (see also Clark et al., 2016).

The concept of boundary objects, however, can also explain social exclusions and blindspots within approaches to resilience. Scholars working in more sociological disciplines have argued that boundary objects should not be defined by what is cognitively agreed about their content, but by what is left unquestioned and undiscussed about them (Baggio, Brown, & Hellebrandt, 2015; Huvila et al., 2014). For example, Brand and Jax (2007) argued the "vagueness and malleability" of different interpretations of resilience allow different actors to work together on this theme "without a consensus about their aims and interests." Accordingly, they also state that boundary objects are a "hindrance to scientific progress" because they serve a purpose in reducing critical scrutiny. In this sense, boundary objects might be similar to so-called development narratives and storylines, which refer to commonly-heard assumptions about cause-and-effect in development practice, but which oversimplify complex relationships, and persist despite the existence of contradictory evidence (Aldunce, Beilin, Handmer, & Howden, 2016; Hajer, 1995, p. 65; Roe, 1991).

Making approaches to resilience more socially inclusive, therefore, depends partly on acknowledging diverse drivers and experiences of risks, and how different stakeholders experience barriers in responding to risks. But it also depends on understanding how analytical approaches to resilience might receive, or be insulated from, critical scrutiny when they act as shared frameworks between different actors.

[2] Holling (1973, p. 14) defined resilience as "the persistence of relationships within a system; a measure of the ability of systems to absorb changes of state variables, driving variables, and parameters, and still persist."

[3] Smit et al (1999)'s original questions for adaptation were: 'what' is being adapted to (i.e. the experience of risk); 'who' adapts (what are the socio-economic barriers to adaptation); and 'how' (how do these actions, adopted by certain groups, reduce vulnerability to environmental change).

2.2. Theories of change processes and approaches to resilience

The processes of developing and implementing theories of change (ToCs) are a useful way to analyze how approaches to resilience become stabilized or open to criticism. ToCs are the justifications used by development organizations to connect their activities with intended outcomes. They are "a theory of how and why an initiative works" (Weiss, 1995, p. 65), or "an explanatory model that links actions with results via causal mechanisms and pathways" (Brooks & Fisher, 2014, p. 16).

Over time, however, debates about ToCs have acknowledged that development interventions rarely use one ToC or causal pathway, but instead rely upon several ToCs that might refer to objectives at different time scales, different collaborating organizations, or different beneficiaries (Funnell & Rogers, 2011; Rogers, 2014, p. 12; Stein & Valters, 2012; Valters, 2014, 2015). Simultaneously, the discussion about ToCs has been increasingly influenced by insights from participatory monitoring and evaluation (M&E), which focuses on revising ToCs by seeking inputs from local stakeholders, and by analyzing learning practices within development organizations (Chambers, 2007; Holland, 2013; Sullivan & Stewart, 2006; Vogel, 2012). Proponents have argued that participatory M&E is part of a broader trend to use M&E for social learning about development interventions rather than for a narrow form of accountability to measure the delivery of outputs or logframes (Eyben et al., 2015).

Accordingly, debates about ToCs have generally shifted from identifying specific causal pathways for change towards being "an ongoing process of reflection to explore change and how it happens" (James, 2011, p. 1). This shift, however, has been called "an illusory process" (Valters, 2014, p. 18) because of a variety of challenges. For example, critics have questioned whether the usual insistence on stakeholder engagement actually involves targeted beneficiaries (Stein & Valters, 2012, p. 14). A further tension is between donor-driven objectives and internally driven ToCs, which might also reduce critical attention to how change occurs (Weiss, 1995, p. 87). These factors have encouraged some analysts to ask whether the processes of discussion and learning under ToC processes should be seen as a "rigid plan or vague vision" depending on the need to achieve specific objectives or engage in open discussion (Wigboldus & Brouwers, 2011). These criticisms do not dismiss the need for ToC processes: they question how far ToC processes actually result in genuine consultation, or progress towards causal pathways (Rogers, 2008).

These debates have relevance for ToCs underlying pathways to building resilience to climatic risks. In principle, participatory approaches to monitoring and evaluation (M&E) offer a framework for answering the questions mentioned above: "what" is the objective of resilience?; "who" is it for?; and "how"? (adapted from Smit et al, 1999). In particular, these approaches seek to identify how far existing ToCs deliver socially valued *outcomes* as opposed to delivering *outputs* or activities that have been defined in the past as pathways to resilient outcomes (Faulkner, Ayers, & Huq, 2015; Gidley, Fien, Smith, Thomsen, & Smith, 2009; McEvoy, Fünfgeld, & Bosomworth, 2013).

These insights, however, have been applied differentially in assessments of climate change policy. For example, some assessments of adaptive capacity—a concept related to resilience—have sought to measure success at the local level by developing appropriate national indicators that can be compared between regions (Dinshaw, Fisher, McGray, Rai, & Schaar, 2014; Leiter, 2015; Price-Kelly, Hammill, Dekens, Leiter, & Olivier, 2015; Ssekamatte, 2018). These assessments provide useful measurements of progress towards implementing policy, but they also leave ToCs unchallenged. Alternatively, participatory M&E approaches seek to consult with beneficiaries of interventions to improve and diversify ToCs (Adler, Wilson, Abbot, & Blackshaw, 2015). This kind of critique has often been applied to climate resilience based on infrastructure alone. For example, research in Nepal argued that stronger bridges installed by the World Bank Pilot Program for Climate Resilience[4] focused on maintaining trade during floods, but failed to address local concerns about access to other livelihoods or medical care (Ayers, Kaur, & Anderson, 2011). Analysts therefore argue that attempts to enhance resilience through infrastructure outputs (such as stronger roads and bridges) should also connect with locally valued outcomes (such as wellbeing and continued access to services), and therefore adjust their ToCs to include the social barriers to resilience as well (Aldunce et al., 2016; Brooks & Fisher, 2014; Faulkner et al., 2015).

Partly as a result of participatory approaches, ToCs for achieving resilience have demonstrated a change from analyzing resilience in terms of physical conditions of ecosystems and infrastructure towards also including social capacities and processes (Constas, Frankenberger, & Hoddinott, 2014; Frankenberger, Constas, Nelson, & Starr, 2014). These newer approaches carry ToCs that assume that building these capacities in affected zones will enhance resilience to risks, including those arising from anthropogenic climate change. For example, Béné et al. (2015); Béné, Newsham, Davies, Ulrichs, and Godfrey-Wood (2014, p. 599) identified absorptive, adaptive, and transformative capacities as different pathways to resilience. They define absorptive capacity as risk management strategies to reduce impacts on livelihoods and basic needs; adaptive capacity as learning and adjustments to external and internal drivers of change; and transformative capacity as the "enabling environment through investment in good governance, infrastructure, formal and informal social protection mechanisms, basic service delivery, and policies/regulations that constitute the necessary conditions for systemic change" (Béné et al., 2015, p. 8) (also based on Berkes et al., 2003). These authors argue that a crucial aspect of transformational change is the ability to challenge current socio-economic conditions that have led to combined ecological, economic and social stresses. Indeed, these comments repeat many concerns expressed in debates about so-called transformational change mentioned above (e.g. O'Brien et al., 2012; Pelling, 2011; Pelling et al., 2015), although Brown (2016, p. 174), Brown, O'Neil, and Fabricius (2013) also argues that there is no clearly agreed definition of transformation (Béné et al., 2014, p. 610; Walker, Anderies, Kinzig, & Ryan, 2006).

These debates about socio-economic transformation, however, have not always been adopted by development interventions. For example, the development initiative called BRACED and DfID have defined resilience as the "ability to anticipate, avoid, plan for, cope with, recover from and adapt to (climate related) shocks and stresses" (DFID, 2014, p. 1), and have identified a complementary set of capacities for resilience called the "3As," or the capacity to anticipate, absorb, and adapt to shocks and stresses (Bahadur et al., 2015; Villanueva & Gould, 2016). Anticipatory capacity refers to early-warning systems, education, and information. "Transformation" is not mentioned explicitly in these capacities, although the relationship between adaptation and transformation is close (Adger et al., 2007; Pelling, 2011; Schipper, 2006). Yet, it is clear that all of these different capacities are based on tacit beliefs about how they will transform social vulnerability or behavior in order to build resilience. Making these tacit understandings of socio-economic transformation more transparent will allow pathways to resilience to become more inclusive.

The concept of boundary objects can assist again with this objective by showing how different understandings of transformation can remain hidden within capacity-based approaches to

[4] https://www.climateinvestmentfunds.org/fund/pilot-program-climate-resilience.

resilience. Indeed, some analysts have already blurred the lines between so-called adaptive resilience and transformative resilience (Bahadur & Tanner, 2014; Brown, 2016, p. 174; Wilson, Pearson, & Kashima, 2013). Moreover, Béné et al (2014, p. 609) also argue either term could also be a proxy indicator of social vulnerability. The possibility for these terms to mean different things is therefore high. These terms might therefore carry social exclusions if they are intended to be used to address problems experienced by local people, but adopt pathways or ToCs that were developed for different problems and stakeholders. It is therefore useful to analyze ToC processes in order to identify whether different interventions carry unquestioned models of risk or social transformation; and whether these approaches address local concerns.

The paper now presents research on different capacities as pathways to resilience in Myanmar as a means to draw constructive lessons about how to achieve more inclusive ToCs and pathways to resilience.

3. Building resilience in Myanmar

3.1. The national context

Myanmar is appropriate for analyzing the social inclusiveness of resilience interventions because it has developing rapidly under various climatic and social challenges. In terms of physical hazards, the country has different climatic zones that experience drought and floods, as well as landslides in mountainous zones (Relief and Resettlement Department, 2015). The so-called Delta Zone of the southwest coastline is exposed to annual flooding, as well as extreme storms such as Cyclone Nargis, which killed more than 84,000 people[5] in 2008. Further inland, the so-called Dry Zone experiences regular drought.

In terms of social challenges, Myanmar has also experienced long-term poverty and social inequality arising from decades of military dictatorships and armed conflict in some zones. It is now undergoing rapid political and economic change, including general elections in 2015. In 2016, Myanmar's Human Development Index was ranked 145 out of 188 countries, with a score of 0.556 compared with 0.720 for East Asia Pacific.[6] Participation of civil society in politics is still limited, and the country is marked by strong inequalities in land tenure rights, and uneven economic development, frequently leading to local migration in search of employment.[7]

Interventions to address climatic risks therefore adopt a variety of approaches. Myanmar's National Adaptation Plan of Action (NAPA) (NECC, 2012) highlighted the diversity of risks, and the country's high dependency on local agricultural production. It also recommended improving early warning systems for floods and droughts, as well as other actions such as diversifying agricultural crops and introducing climate-resilient varieties (NECC, 2012, p.9). The Myanmar Climate Change Strategy & Action Plan (MCCSAP) for 2017–2030 identifies a roadmap for climate resilient development, based on developing low-carbon transport, fisheries and climate-smart agriculture.[8] The World Bank Flood and Landslide Emergency Recovery Project (FLERP) has also intervened to build climate-resilient infrastructure such as roads.[9] The United Nations Development Programme (UNDP) has also undertaken work to increase gender-sensitive information concerning climate-related hazards and risk management.[10] These initiatives conduct important work by building capacity and strengthening infrastructure, largely by working with national and local government actors.

3.2. The BRACED initiative

The initiative known as BRACED (Building Resilience and Adaptation to Climate Extremes and Disasters) is a useful example of an approach to resilience that targets social capacities rather than infrastructure or ecosystems alone. It is therefore an appropriate example to study ToCs processes and social inclusiveness relating to resilience. This paper, however, should not be interpreted as a criticism or a formal evaluation of BRACED.

BRACED in total currently comprises 15 projects across the African Sahel and South and Southeast Asia (BRACED, 2015).[11] BRACED in Myanmar involves a collaboration of organizations with different specialist skills, including Plan International (the consortium coordinator), ActionAid Myanmar, BBC Media Action, the Myanmar Environment Institute (MEI), UN-Habitat, and World Vision. The initiative acknowledges the unprecedented institutional, social and economic change in Myanmar.[12] At the time of research, the network was engaged in a three-year program to "implement a robust model of community resilience" in 158 villages across Myanmar, especially focusing on women and children.[13]

BRACED-Myanmar has a consortium-wide ToC (see Fig. 1), but it also comprises a range of diverse and inter-connected ToCs and ToC processes. The consortium-wide ToC distinguishes stakeholders, outputs, and outcomes. Stakeholders are communities, local and national government, and civil society organizations. Outputs include improved support, knowledge, capacity, and policies to address resilience. Outcomes comprise improved wellbeing and enhanced resilience. Progress towards resilience can be indicated by the "3As" discussed above of anticipatory, absorptive, and adaptive capacities, which also are justified on individual ToCs relating to each capacity (Bahadur et al., 2015).

Moreover, each organization in the consortium has its own ToC: for example, ActionAid defines its approach as a rights-based and empowerment organization[14]; BBC Media Action specializes on communication[15]; whereas UN-Habitat had invested in access to drinking water.[16] The funding organization, DfID, also implemented its own ToC to gain collaboration, mutual learning, and value for money within consortiums.[17]

BRACED also engages in ToC processes as sites of learning and interaction.[18] It adopts a participatory approach to M&E, noting: "genuinely understanding resilience in practice means moving away from a logframe driven and 'accountability' M&E culture" (Villanueva & Gould, 2016, p. 4).

The objective of the research was to consider the social inclusiveness of the three pathways to resilience represented by anticipatory, absorptive, and adaptive capacities, and to learn lessons for how ToC processes might increase or decrease critical scrutiny of ToCs as proposed pathways to resilience.

[5] http://www.ifrc.org/en/news-and-media/news-stories/asia-pacific/myanmar/myanmar-cyclone-nargis-2008-facts-and-figures/.
[6] http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/MMR.pdf.
[7] http://lcgmyanmar.org/en/.
[8] http://myanmarccalliance.org/en/mccsap/.
[9] http://www.worldbank.org/en/news/press-release/2016/07/14/myanmar-to-receive-us200-million-in-financing-for-post-disaster-recovery-and-reconstruction.
[10] http://www.mm.undp.org/content/myanmar/en/home/operations/projects/environment_and_energy/environment–climate-change–energy-and-disaster-risk-reduction-/.
[11] http://www.braced.org/about/about-the-projects/.
[12] http://www.braced.org/resources/i/Towards-a-resilient-Myanmar/.
[13] http://www.braced.org/news/i/?id=8abe85e7-c085-4484-8e15-0336a9fc1fbc.
[14] Interview with Shihab Uddin Ahamad, Country Director of ActionAid Myanmar, Yangon, 2017.
[15] http://www.bbc.co.uk/mediaaction.
[16] https://unhabitat.org/myanmar/.
[17] Interview with Clare Shakya, UK Department for International Development, 9th CBA conference, Nairobi, 2015.
[18] Interview with Jeremy Stone, PLAN, Yangon April 2015.

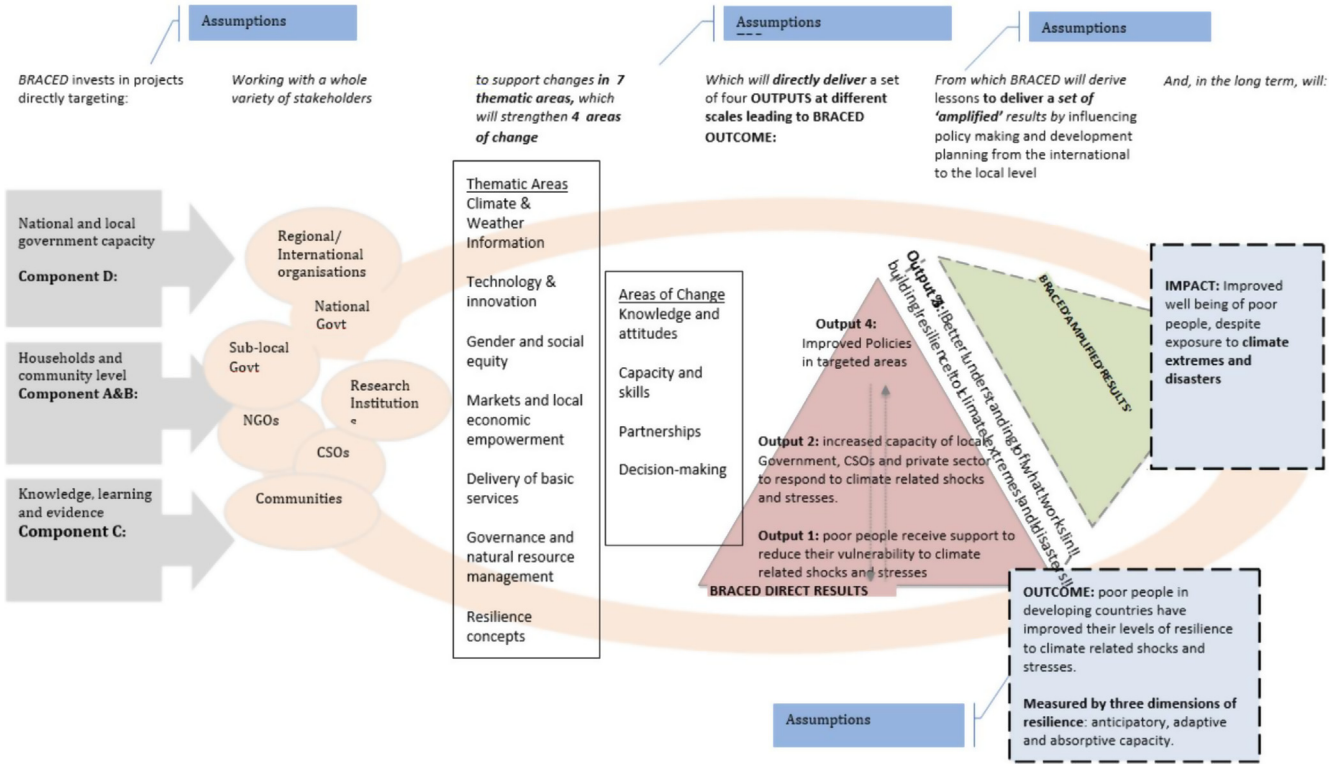

Fig. 1. The BRACED draft theory of change (BRACED, 2015, p. 79).

4. The study

4.1. Objectives

The study had three objectives:

- To analyze the social inclusiveness of different pathways to resilience by comparing local experiences of risk and resilience in four villages in Myanmar with the theories of change (ToCs) underlying the building of anticipatory, absorptive, and adaptive capacities.
- To identify the ToC processes, including tacit models of risk and socio-economic transformation, used by development organizations to understand how different pathways were adopted, applied, revised, or left unchallenged.
- To draw constructive lessons from these studies for making ToC processes and pathways to resilience more socially inclusive.

The three pathways of anticipatory, absorptive, and adaptive capacities were selected in order to coincide with the BRACED initiative. These capacities, however, are intended to refer to debates about resilience beyond BRACED. In particular, the three capacities can be taken to infer actions over three time periods: *before* specified risks (pre-emptive action, or anticipation); *during* risks (coping, or absorption); and planning for the *future* (long-term adaptation or transformation). The aim, therefore, was not to evaluate BRACED as a single initiative, but to use the study about BRACED as a way to draw general lessons about the social inclusiveness of pathways to resilience.

4.2. Selection of sites

Fieldwork was undertaken in four villages, which were selected using three criteria. First, villages were selected to reflect a range of physical environmental threats and socio-economic inequality. Two villages each were selected in the Delta Zone (exposed to river flooding and cyclones) and the Dry Zone (exposed to drought). Second, the villages were already included within the BRACED-Myanmar initiative. Third, villages were identified as typical of local socio-economic and physical conditions, and as comparable to each other in terms of size, history, ethnic homogeneity, and distance to market towns.

Entry to villages in Myanmar is frequently controlled by rules imposed by local police: foreign researchers are not allowed to stay overnight, and access is commonly allowed only through local development organizations. The selection and access to villages was therefore assisted by ActionAid Myanmar, which is a member of BRACED-Myanmar, with a specialism on livelihoods and poverty.[19] ActionAid provided lists of villages in both zones in order to aid selection, and then provided translation and transport. ActionAid played no role in shaping the research questions or findings.

The villages selected had already received various development interventions from government or foreign assistance. For example, ActionAid had selected and trained young men and women in each village to become local coordinators of self-help groups; UN-Habitat had also built drinking water wells in the Dry Zone. The villages were also included in the 158 settlements involved in BRACED Myanmar. However, it should be noted that the study was not in itself an evaluation of BRACED.

Table 1 shows the location and characteristics of the villages selected. The two villages in the Delta zone were near the city of Pathein, about 50 km from the coast, and some 200 km from the capital city of Yangon. This region is characterized by low-lying land crisscrossed by river channels, with interspersed zones of irrigated rice fields and forest cover. Annual rainfall is approximately

[19] http://www.actionaid.org/where-we-work/asia-australia/myanmar.

Table 1
Villages selected for study.

Village name	Township (District)	Main climatic risk	Latitude and Longitude	Established	Population (2015)	Households (2015)
Taung Ka Lay	Shen Kwin, Pathein	Flood	16.8956°N 94.6463°E	1961	420	78
Pann Taw Gyi	Sa Pa Hta, Pathein	Flood	16.8816°N 94.6445°E	1858	620	85
Yae Ngan	Myingyan, Meiktila	Drought	21.0203°N 95.3083°E	1844	480	67
Than Taw	Thaung Tha, Meiktila	Drought	21.2744°N 95.4787°E	1951	437	64

Sources: Interviews in villages, locations confirmed from Google Maps.

2800 mm,[20] and the region was on the edge of the zone most affected by Cyclone Nargis in 2008. The main local river is the Pathein River, which frequently breaks its banks during the summer rains, and is predicted to flood more frequently (NECC, 2012; Relief and Resettlement Department, 2015). The ethnicity of the selected villages in the Delta region is Karen (with Christian religion). Villages are typically elongated along river channels and beside irrigated rice fields.

The two villages in the Dry zone were near the city of Meiktila in central Myanmar. This zone is some 600 km to the north of the Delta zone, and is ethnically Burmese (with Buddhist faith). This zone is some 400–500 km from the coast, and some 200 km from the important trading city of Mandalay. Annual rainfall here is 824 mm,[21] and a drought has been described here since 2010 (Khaing, Zin, & Kyi, 2016). Villages are characterized by narrow streets of wooden houses, sometimes on stilts, connected by mud roads.

4.3. Methods

Empirical work was conducted over a period of five weeks in 2015, with additional research in 2016 and 2017. Information in villages was collected in three stages. First, a collaborative public meeting was arranged by local assistants of ActionAid that invited villagers to discuss environmental risks and vulnerability. These meetings attracted between 40 and 90 people in each village, and provided initial information about concerns, social divisions, and relevant social groups. These meetings typically took about 90 min, and allowed the researcher to identify some key informants, as well as social groups in each village that could be targeted by further interviews.

Second, the insights from the group meeting were investigated further by holding smaller meetings with single or several key informants who represented different groups in each village. Typically, there were land owners, landless laborers, members of a specialist village organization such as the Women's Self-Help Group, or individuals who had undertaken new initiatives, and were people who represented important social groups in the village, or who had been identified by the earlier group discussion as having particular agency in experiencing or responding to risks related to climate. These smaller discussions were usually with between 6 and 10 people in groups, or between 3 and 6 individual interviews per village. The discussions with women groups were the only occasions where informants were single gender: the researcher used a female translator in the Delta Zone, and a male translator in the Dry zone, but on both occasions these meetings also involved a female coordinator from the village who had been trained by ActionAid.

Thirdly, individual households were then interviewed in order to represent specific categories of villager that earlier informants had described as especially vulnerable or challenged. In these cases, both men and women household heads were interviewed, together or singly, depending on who was available to speak. These household surveys numbered between 10 and 25 per village. Interviewees were organized on a semi-structured basis, and were designed to generate comparable information between different villages, as well as opportunities for individual people to describe particular circumstances. People were asked to define environmental risks in an open-ended way by asking them what problems they experienced with livelihoods, land, and agriculture; and then to rank these problems. Questions then asked about potential pathways to addressing these challenges, and building longer-term resilience. These responses led to quantitative information (summarized in Table 3), as well as qualitative impressions and opinions.

The research took special care not to place informants at risk by appearing to discuss politics or to criticize authorities. Informants and household surveys were kept anonymous. Nonetheless, some informants were keen to highlight some criticisms, such as the actions of the army in annexing some village land. All work with villagers was conducted in Burmese language with a translator.

The empirical work with development organizations was conducted via interviews and group discussions in English in field offices near the research sites, and in head offices in the capital city of Yangon. The research particularly relied on interviews with ActionAid Myanmar, BBC Media Action, and Plan International. In addition, two day workshops in Pathein and Yangon, and an international conference on Community Based Adaptation to Climate Change[22] also offered opportunities for further interviews with other organizations engaged in building resilience in Myanmar. The objectives of these interviews were to identify the processes by which organizations developed and then revised ToCs.

Table 2 shows the interviews and household surveys undertake in each village. Table 3 summarizes economic activities and landholdings of villages. Table 4 summarizes the study findings about different pathways to resilience, and how each of the "3As" capacities contain different tacit models of risk and socio-economic transformation.

5. Findings: different pathways to resilience

5.1. Anticipatory capacity

Anticipatory capacity is defined as the ability of social systems to anticipate and reduce impacts of climatic events through preparedness and planning (Bahadur et al., 2015, p. 23). In BRACED Myanmar, various development organizations contribute to knowledge and group discussions of risks within villages. In particular, BBC Media Action specializes in disseminating information through television, websites and other media as a means of building awareness. It has won praise in Bangladesh for its reality television program, *Amrai Pari* (Together we can do it), which builds awareness of risks and responses at the community level.[23] This television work is so far not developed in Myanmar, however. The

[20] https://en.climate-data.org/location/314/.
[21] https://en.climate-data.org/location/324/.
[22] https://www.iied.org/cba9-9th-international-conference-community-based-adaptation-cba9.
[23] http://www.bbc.co.uk/mediaaction/publications-and-resources/research/summaries/asia/bangladesh/reality-tv-for-resilience.

Table 2
Interviews and household surveys per village.

	Delta Zone		Dry Zone	
Village name	Taung Ke Lay	Pann Taw Gyi	Yae Ngan	Than Taw
No. of household surveys	25	19	15	10
	30% female	50% female	50% female	60% female
	45% male	40% male	30% male	30% male
	25% male & female	10% male & female	20% male & female	10% male & female
No. of key informant interviews	6	6	5	3
	4 male	3 male	2 male	2 male
	2 female	2 female	3 female	1 female
No. of group discussions	3	3	2	2
	1 female specific	1 female specific	1 female specific	1 female specific

Table 3
Summary of livelihoods and landholdings per village.

	Delta Zone		Dry Zone	
Village name	Taung Ke Lay	Pann Taw Gyi	Yae Ngan	Than Taw
Population (2015)	420	620	480	437
Households	78	85	67	64
Households with titled access to agricultural land (%)	21%	50%	58%	47%
Average agricultural land holding (ha)	5.7	10.4	1.9	2.1
Highest reported agricultural land holding (ha)	6.9	14.6	3.5	3.5
Main agricultural crops	Rice, sugar beet, beans, chilli	Rice, sugar beet, beans, chilli	Beans, tomato, chilli, cotton	Peas, sesame, cotton, maize
Main livestock	Goats, chicken, ducks, pigs, cows	Goats, chicken, ducks, pigs, cows	Goats, cows, pigs, chicken	Goats, cows, chicken, pig
Migrants working outside villages (included in village population)	35 people (c 8%)	40 people (c 6%)	150 people (c 31%)	110 people (c 25%)
Average daily wage of laborers (women) (USD)*	2–2.5	2–2.5	2–2.5 (2 for quarry work)	2–2.5 (2 for quarry work)
Average daily wage of laborers (men) (USD)*	3	3	3 (4–5 for quarry work)	3 (4–5 for quarry work)

Sources: Fieldwork.
* Conversion rate: 1000 Kyats = 1 USD.

Table 4
Observed social exclusions under different resilience pathways (anticipatory, absorptive, adaptive capacities).

	Anticipatory	Absorptive	Adaptive
Typical actions	Early warning and awareness raising of specific hazards	Coping mechanisms during hazard	Learning to diminish impacts of hazard over time
Examples from study:	Training, mobile phone messages, radio, television	Seeking alternative income, short-term migration, rice banks, affordable loans	Long-term transitions in livelihoods, e.g. from agriculture to remittances, higher-value crops and drought- or flood-resistant livestock
What and who is included?	Warnings of extreme events, allows landowners to harvest crops	Rice banks offer food security, self-help groups offer affordable loans	New crops and livestock assist villagers wiling to diversify (e.g. ducks, goats)
What and who is excluded?	Does not address livelihoods of laborers	Does not achieve alternative incomes or employment for laborers	Does not address problems of accessing new livelihoods in new sectors, or political controls on land, few farmers innovate
Implicit model of risk contained in each capacity	Risk located in lack of knowledge of climate	Risk located in exposure to climatic events	Risk located in barriers to learning and diversification
Implicit model of transformation contained in each capacity	Village authorities, self-help groups, and media can produce resilience	Village authorities, self-help groups, and development organizations can enhance services and infrastructure	Villages, self-help groups, and individuals can increase options for livelihoods, employment, and security

Sources: Fieldwork and discussions with development organizations.

theory of change (ToC) underlying anticipatory capacity, therefore, is that pre-emptive knowledge and action will contribute to resilience against these risks. Who might, or might not, benefit from this assumption?

Evidence from the study demonstrated that pre-emptive information about especially hazardous risks was discussed during group meetings, and by some informants. These comments, however, mainly referred to the extreme events such as dangerous cyclones, rather than pre-existing risks such as annual river flooding or drought, even if these might become more serious.

In the Delta zone, the highest ranked hazard was annual river flooding.[24] Flooding made cropland close to the rivers unusable for between 6 and 10 weeks a year in both villages. It also flooded some low-lying houses. In both villages, some 30–40 households (or 40–50%) were affected by lost cropland or damaged housing per year. Villagers also mentioned other hazards—occasional damage from

[24] Information is based on summaries of group discussions and individual interviews and household surveys.

large storms, and damage to crops from wild elephants. The storm events, however, were ranked as less significant than annual flooding.

Advance knowledge of climatic events, moreover, might benefit landowners more than waged laborers. Table 3 shows that the Delta zone villages were characterized by strong inequalities in land ownership. The average proportion of landowners in across the two villages was just 35.5%—and indeed as low as 21% in one village (Taung Ke Lay).[25] In effect, this distribution meant that the majority of people living in the villages worked as laborers on the land owned by a minority. This situation implied that flooding posed different risks to landowners and laborers (see Table 4). For landowners, the main risk was losing crops, and especially large-scale production such as irrigated rice and sugar beet. These crops usually reached maturity simultaneously as the rainy season in the summer. For laborers, the main risk was to lose opportunities for labor. Villagers explained that the onset of flooding usually led to periods of some days when landowners would hire labor to collect crops, but after harvesting there was little availability for paid work until the floods dissipated.

In the Dry zone, villagers clearly identified drought as the key climatic risk. Indeed, different observers commented that significant rain had fallen since 2013. Anticipatory knowledge about drought was therefore likely to be less useful than concerning floods, as drought is a slow-onset process. But the evidence from the problem-ranking exercise also described two unexpected problems not related to climate. In 2008, about half the agricultural land available to one village (Yae Ngan) had been appropriated by the Burmese army for an artillery range. The second problem was that Myanmar's rapid economic growth in road construction had created a new trend of people digging up boulders from agricultural land in order to sell to roadworks to be broken down into gravel. Villagers explained that agricultural land that had been left uncultivated was treated as open access by unscrupulous traders. The lack of rainfall exacerbated this situation because it meant that cropland had decreased in recent years. Removing boulders also removed topsoil and exposed underlying rocks, rendering the land less useful for agriculture. A similar problem occurred in using trees on uncultivated land for firewood.

Evidence therefore indicated that anticipatory capacity is most useful as a pathway to resilience when climatic events are rare, unexpected, and affect the entire village such as extreme floods or cyclones. Such events might occur in the Delta zone more frequently in the future, (NECC, 2012). Yet, when events are less rare, anticipatory knowledge alone does not address the most highly-ranked problems that affect people's livelihoods. It does not address the challenges of laborers who might lose income following a flood; indeed it helps the larger landowners keep the value of their crops. In the Dry zone, anticipatory knowledge had only limited benefit to because the drought had been experienced for a long time.

5.2. Absorptive capacity

Absorptive capacity is defined as the ability of social systems to absorb and cope with the impacts of climate variability and extremes (Bahadur et al., 2015, p. 30). According to systems analysis, it can also be called functional persistence, or the ability of a system to endure impacts of climate extremes in the short term (Folke et al., 2010). The underlying ToC, therefore, is that absorptive capacity can enhance resilience to climatic risks by allowing people greater ability to withstand these events in the short term.

As described above, in the Delta zone the most highly-ranked risk connected to floods was the loss of income for laborers. To absorb this impact, many laborers took out loans to cover short-term shortages in finance, but interest rates were expensive at typically 10% per month. Lenders were often the landowners in village, or from other villages. Few individuals wished to discuss their experiences with loans, but in group discussions villagers suggested that about half of both villages would have loans at any one time. The most frequent items bought with loans would be to service other existing debts, or to cover the purchase of livestock such as goats or carts. Another coping action was to seek alternative labor. According to household surveys, typical daily wages in the Delta zone varied between $2–2.50 a day for women, and $3 for men. This work tended to be agricultural work in zones unaffected by floods. Both villages relied on laborers living locally: there was no evidence of inward migration in recent years.

All landowners interviewed in the Delta zone were engaged in various other activities as well as agriculture. Floods therefore did not challenge livelihood options as much as waged laborers.

Villages, however, had adopted various forms of communal help. Self Help Groups for women had been established in 2014 (with the assistance of ActionAid), and Village Disaster Management Committees had been established in 2015. The objectives of these committees were to offer cheaper loans and assistance for members, and to communicate about floods and offer potential assistance afterwards. Typical loan rates from these groups were 2% per month, in comparison to the 10% usually charged by landowners. Both villages also employed communal institutions to alleviate risks. For example, both villages had rice banks, where villagers were allowed to remove 100 lb (45.4 kg) of rice on condition they returned 150 lb (68 kg) after three months. This rice could be grown on personal land, purchased in markets, or borrowed from personal contacts.

A main limitation on absorptive capacity, however, was the need to gain access to drinking water before and after floods. Collecting water was a constraint on time available for livelihoods—there was no piped water in either village. The household surveys showed that collecting water from wells was undertaken in more than 80% of cases by women or children. It also took an average of 30 min per trip to retrieve water from wells for both villages, with an average of two to four trips per day. Carts were available for collecting for collecting water but were owned by landowners, who also charged 100 Kyat (c $0.1) for each trip. Simultaneously, individuals could also be paid $0.1 per trip for collecting water for households.

In the Dry zone, the most common response to drought in the short-term was to rely less on agriculture, and to seek alternative sources of income. On average, 28% of people in both villages had migrated from the village to seek jobs elsewhere (some 260 adults). The two most popular jobs undertaken by migrants was quarry work (in various locations in Myanmar), or restaurant work in Mandalay. One family noted that restaurant workers there could earn $120 per month after two years' experience.[26] These incomes were significantly more than the equivalent cash value of agricultural work in the two villages studied. Waged labor for men in quarries was also higher than local agricultural labor, with a typical daily wage of $4–5.

But there were also limitations and inequalities about waged labor. As with the Delta Zone, women laborers were paid less than men (see Table 3). Despite the availability of wells (such as those built in villages by UN-Habitat), many women and children still collected water from the local watercourse between two and four

[25] Ownership of land was indicated by having a government-recognized land title, rather than informal or ancestral claims without certificates.

[26] They also added that the $120 monthly income included tips, and that a newcomer to this job would expect to earn $90 a month. Restaurant work usually also included accommodation in a dormitory. (Conversion rate is 1000 Kyat for $1).

times a day. Local cultural practice meant that it was considered inappropriate for women to drive bullock carts.

There were also limitations on gaining alternative employment. Social networks and family connections mattered for jobs in different locations. For example, two households described how their sons had gained jobs in Mandalay because their cousin and uncle had already worked at a restaurant there. Some other young men (estimated to be ten in total) had also joined the local army camp. The evidence from interviews, however, indicated that only a few individuals had decided to move permanently to Mandalay.

Evidence therefore indicated that absorptive capacity offered various ways of reducing impacts of climatic risks as they happened. In particular, the construction of rice banks was widely acknowledged to reduce risks of food insecurity for the most vulnerable in Delta zone villages. Other forms of absorption, however, were difficult to differentiate from longer-term socio-economic transitions that might also be labelled as adaptive capacity (see next section). For example, the most common form of absorption in the Dry zone, of seeking alternative employment, was also influenced by gendered inequalities in labor markets, and selective access to alternative employment. Moreover, the simple coping mechanism of taking our loans is another process that emphasizes the difference between laborers (who take our loans) and landowners (who make loans). As discussed in Section 6, the benefit of interventions to build absorptive capacity depend in part on the implicit models of risk and socio-economic transformation adopted within the ToC.

5.3. Adaptive capacity

Adaptive capacity is defined as the ability of social systems to learn and adjust after extreme events in order to reduce the likelihood of negative impacts in the future (Bahadur et al., 2015, p. 13). As noted in Sections 2 and 3, the BRACED initiative uses the term adaptive capacity, although other analysts might argued that all of the "3As" refer to different aspects of adaptation in general; and that the essence of this last capacity is a focus on future transformations and learning. The ToC underlying adaptive capacity, therefore, is that this capacity will be a pathway to resilience because it will allow a long-term transformation in social behaviors and exposures that diminish negative impacts of climatic risks.

In the Delta zone, all landowners interviewed had diversified agricultural production from the standard crops of rice and sugar beet to include small amounts of higher-value crops such as tomatoes, beans, or gourds such as cucumbers. Landowners, however, were in a relatively privileged position of having more income and opportunities for investing in alternative income sources. No landowners had acted to adapt to flooding risks by building physical infrastructure such as levees.

Innovations by laborers, by comparison, were relatively poorly developed. Some laborers had diversified into producing high-value vegetables by renting small plots of land from landowners. One entrepreneur had borrowed money to rent land to establish a duck farm (this was established in 2014, and at the time of research was the only duck farm in both villages). As noted above, relatively few people migrated from the village to seek other jobs: an average of just 7% of all population (some 75 adults) (see Table 1). In most cases, migrants had travelled long distances such as to the capital city, Yangon. Just two people were working overseas (in Bangkok and Singapore). Self-help groups also assisted with long-term learning about different crops.

The limitations on long-term learning and adjustment, however, were related to some of the underlying inequalities in the villages. Land ownership was concentrated into a relatively small proportion of both villages. In both villages, women had only been allowed to claim land ownership in their own name since 2010. The longer-term processes of adaptation, therefore, were characterized by two different streams depending on whether households or individuals had access to land, or were laborers. Longer-term transformation for non-land owners was also limited by the relative lack of mobility and opportunities for people to work in different locations or develop non-agricultural forms of business.

In the Dry zone, about 25% of households had diversified livelihoods since 2013 by expanding their ownership of goats as drought-tolerant livestock. The people investing in goats were typically landowners who were affected by declining agricultural yields: in Yae Ngan village, this group also included very small landowners who had just one or three acres. The job of looking after goats was given to household members, who often looked at neighbors' goats on a reciprocal (but unpaid) basis. A smaller proportion of households surveyed (8%) also used drought-tolerant crops such as sesame and cotton, although these crops had been used for years before the recent drought (Table 3).

A more common response in the Dry zone, however, was pessimism about long-term agriculture in the region, and the reality that village land had become less significant for generating household income. Approximately 52% of both villages in the Dry Zone had certified claims to land. But under the conditions of drought, villagers now sought alternative livelihoods based on migration, remittances, and non-agricultural income. In one village (Than Taw) villagers claimed that crops had declined by 66% since 2010, and one farmer stated "farming is no longer viable here." Drought, of course, is just one factor among many that might contribute to decline in crops. Various informants, however, shared the view that long-term adaptation implied moving away from a reliance on agriculture. Neither village produced staple crops such as rice. Indeed, various informants claimed that the overall economy of the villages in the Dry zone was changing from a traditional reliance on agriculture towards using land in villages as collateral for loans, and as a node for different family members to conduct different livelihoods in different places. For example, villages (and the houses where people lived) were now treated generally as homes for the youngest and oldest generations—i.e. grandparents looking after grandchildren—while adult parents earned incomes elsewhere.

Evidence about adaptive capacity, therefore, largely referred to the broader transitions occurring in economies, and the possibility for different social groups (including genders) to gain access to livelihoods within these changes. Yet, as with absorptive capacity above, the inclusiveness of adaptive capacity partly depends on the definition of the risks or challenges that it is meant to address. The social learning that enables individuals in the Delta zone to reduce the negative impacts of floods are inherently connected to underlying social structures that distinguish between families with or without claims to land, and the access to funds and assets (such as secure housing, transportation, and collateral) that comes with that. The main opportunities observed in the Dry zone also referred to the sudden growth of attractive economic livelihoods in neighboring cities as well as the combined social and physical changes that make farming on contested dry land less attractive than before. The adaptation under these conditions is not driven by the physical climatic risks such as floods or droughts, but by the ability to gain access to these new opportunities.

The inclusiveness of adaptive capacity as a pathway to resilience, therefore, depends on the way in which adaptation is defined vis-à-vis broader transformational change, and the opportunities for vulnerable people to participate in these changes. Defining adaptive capacity too narrowly in terms of learning to avoid floods and drought as risks, might miss the broader driving forces of what makes these physical events hazardous, and consequently pay insufficient attention to what might constitute inclusive pathways to resilience. This point has also been made in relation to the

driving forces for adaptation to climate change (Christoplos et al., 2009; Forsyth & Evans, 2013; Patnaik & Das, 2017; Sabates-Wheeler, Mitchell, & Ellis, 2008).

6. Theories of change processes

This section now discusses the findings above with insights from interviews with development organizations. The objectives are to identify the ToC processes that might influence chosen pathways to resilience, especially tacit models of risk and socio-economic transformation, and how far these can be understood as boundary objects.

6.1. Models of risk

The discussion of fieldwork above showed that the "3As" framework adopted useful interventions such as awareness-raising, safety nets (such as rice banks), and economic empowerment (self-help groups) that reduce negative impacts of floods and droughts. Indeed, these activities are also listed as achievements under BRACED's own M&E assessments, which refers to successful outcomes such as enhanced women and children's participation in decisionmaking, better communication, and better all-round resilience through access to food and diverse livelihoods. These achievements are summarized in Table 5.

But at the same time, these assessments of resilience are also based on assumptions about the cause-and-effect of risk and resilience that might narrow down the range of risks experienced by people, and consequently potential pathways to resilience as well.

First, the fieldwork findings questioned the ability to treat events such as floods and drought as risks that affect all people universally. In particular, the evidence showed that floods impacted on land owners and laborers differently. Landowners struggled to harvest crops in time, and then faced some months with unproductive agricultural land. Landless laborers, on the other hand, faced an end to their main source of income. Similarly, the impact of drought varied between households according to their ability to access alternative income. The impact of drought was also affected by secondary and exogenous factors such as the enclosure of land by the army, or the unscrupulous removal of boulders from unused land. A model of risk that assumes universal threats arising from floods and droughts therefore avoids socio-economic factors that make these physical changes hazardous.

Secondly, this concern can also be applied to the treatment of women and children as universal demographic categories. Fieldwork indicated that women experienced various inequalities, such as barriers to land ownership, lower wages, or restrictions on transport. Yet, there were also other socio-economic influences on women's agency, such as their status as landless laborers, or single household heads. The exposure of individuals to risk is therefore connected to both gender and economic status.

And consequently, thirdly, these findings present challenges for how far the "3As"—in their current formulation—represent pathways towards resilience because these terms are organized around the physical changes associated with climatic risks. They do not, for example, emphasize the economic activities impacted on by physical events, nor the underlying social and economic conditions that regulate vulnerability to those events. In particular, the "anticipatory" aspect of the "3As" has the potential to save lives by providing early warning and educational material about risks, yet at the same time, anticipatory capacity is the most likely capacity to adopt a universalist model of risk that avoids the different vulnerabilities of individuals. This tension is perhaps reflected in BRACED's own evaluation, which states that "accessing and using weather and climate information is a critical element in building

Table 5
BRACED-Myanmar theory of change: resilience measurement framework at household level.

Dimension	Preparedness and Coping Mechanism	Resilience of System and Livelihood	Establishment of Safety Nets	Communication, Access and Use of Information	Decision-Making and Planning
Capacity (using "3As") Emphasis Examples	Anticipatory 20% –Plans to cope with shocks –Access to safe places	Adaptive 30% –Access to food –Access to drinking water –Diversified incomes sources	Absorptive 15% –Access to improved loans –Savings –Access to external help –Stable or increased income	Anticipatory 20% –Access to weather information –Assets to receive information	Adaptive 15% –Women and children's participation in planning and decision making –Women's confidence in raising concerns to authorities, etc.

Source: Adapted from BRACED (2017, p. 2c) to show different capacities.

anticipatory, absorptive and adaptive capacities" (Villanueva, Gould, & Pichon, 2016, p. 11)—yet also that "addressing and dealing with the socioeconomic and political dimensions of resilience-building are equally important" (Villanueva et al., 2016, p. 13). Despite this statement, it is still possible that delivering climate information to new users might be taken, *de facto*, to be the delivery of resilience. Indeed, BRACED (2017, p. 3e) noted that 359,000 people across Myanmar have been reached by resilience and adaptation messages. This number is chiefly a measurement of outputs, based on a ToC that highlights the importance of information, rather than an measurement of resilience as an outcome.

6.2. Models of transformation

As noted above, the BRACED-Myanmar consortium contained different organizations who shared a common ToC for resilience, but with different assumptions about how to enact social change or transformation. Table 4 shows these tacit assumptions or models of socio-economic transformation as contained in each of the "3As." The point of this information is to show how each of the three capacities (of anticipatory, absorptive, and adaptive) might also contain implicit ideas about socio-economic transformation even if "transformative capacity" is not identified separately.

Representatives of Plan International and ActionAid[27] stated they performed interventions to increase local agency and decrease socio-economic vulnerability within villages, such as the creation of self-help groups, or greater representation of marginalized groups in local decisionmaking. BBC Media Action, on the other hand, emphasized access to climate information as a key means of avoiding risk.[28] This second model still acknowledged social influences: one informant from BBC Media Action suggested that dissemination inside households often depended on whoever had the TV remote control. This implicit model of vulnerability to climate-risks, however, referred to a deficit of knowledge rather than socio-economic structures and inequalities.

The study provided evidence that current approaches to absorption and adaptation inside villages occasionally reinforced social inequalities. As noted above, anticipatory capacity tended to benefit landowners in the Delta zone more than laborers because it gave the knowledge to protect their crops from floods. Yet, following floods, laborers often coped with the loss of livelihoods by taking out loans from land owners who charged high rates of interest. Carts for collecting water were also available for hire from landowners.

The "3As" framework allowed some interventions to overcome these barriers, such as by allowing self-help groups to offer loans at cheaper rates (2% interest per month instead of 10%). Rice banks also provided immediate food security for poorer people affected by floods or drought. These interventions have an implicit model of transformation based on empowering individuals and organizations within the village to take responsibility for these approaches to resilience. They do not acknowledge the role of the state or military in controlling land, or influencing markets. Yet, perhaps this is unsurprising. Informants in Plan International and ActionAid noted that all non-governmental organizations in Myanmar are limited in criticizing the government, or engaging with entrenched inequalities. Accordingly, it was easier to work with government agencies by discussing technical solutions to climate risks rather than seeking responses to social and economic inequality.[29] This important point complements earlier criticisms (e.g. Levine, 2014, p. 15) that blindspots in resilience thinking occur because it is "easier to measure 'objective' events such as rainfall than it is to 'measure' the circumstances which deprive some people of access to irrigation." The evidence from this study is that sometimes this is because of the constraints that development organizations work under.

6.3. Theories of change as boundary objects

Various pieces of evidence therefore suggest that pathways and ToCs of resilience serve as boundary objects because of the way they are shared by different actors yet offer different meanings. For example, the statement that BRACED (2017, p. 3e) had impacted on 359,000 people in Myanmar points to combined activities of different organizations, using diverse pathways. But as noted above, these pathways are not universally beneficial, and might even fail to address diverse experiences or causes of risks. Resilience becomes a boundary object when it allows different organizations to claim their own outputs as equivalent to achieving a shared outcome.

One possible explanation for this situation came from ActionAid's country director: "the usual trend for consortiums is that each organization's representative carries out its own objectives: there is no time or incentive for individuals to adapt that framework for the consortium."[30] This statement has also been made in debates about participatory M&E: Faulkner et al. (2015, p. 92) has argued that organizations tend to persist in doing what they do well. She urges "We need to move beyond asking 'Are we doing what we said we would do?' to 'does it work?,' which begs the question of 'Who does it work for?'" It is difficult to challenge pathways to resilience if they have historic evidence of being useful, or if there is a chance that they might be useful for some users. Persisting with these pathways in all cases, however, might result in confusing the delivery of outputs with the achievement of resilience as a final outcome.

There are therefore diverse reasons why ToCs might persist as boundary objects: the dynamics of individual organizations within coalitions; the possibility that all pathways will be useful eventually; and the constraints of working under authoritarian conditions. If these pathways are based on contestable but unchallenged models of risk and transformation, then there is a chance that ToC processes will continue to be socially exclusionary. Instead, it is important to ask what experiences and causes of risks are left unexplored, and how do existing ToC processes crowd out attention to more flexible and locally sensitive alternative ToCs.

7. Conclusion: making climate resilience more inclusive

This paper has used an empirical study of resilience in Myanmar to identify ways to make theories of change (ToCs) and pathways to climate resilience more socially inclusive. Various conclusions can be made.

First, the discussion of ToCs within development planning in recent years has changed from a culture of delivering outputs and logframes, towards using ToCs as an ongoing framework for learning and revising causal pathways (Rogers, 2014; Stein & Valters, 2012). Evidence from this study, however, suggests that ToC processes can still leave important assumptions tacit and unquestioned. In particular, this study has highlighted implicit models of risk and socio-economic transformation. These models underlie discussions about ToCs for pathways to resilience, but these models also can fail to acknowledge diverse experiences and causes of risk, including socio-economic barriers to resilience (also see Brown, 2016, p. 174). This challenge applies especially

[27] Interviews in Meiktila and Yangon, April 2015.
[28] Interviews in Yangon, April 2015, and 9th International Conference on Community Based Adaptation, Nairobi, April 2015.
[29] Interviews with PLAN and ActionAid in Yangon, April 2015 and July 2016.
[30] Interview with Shihab Uddin Ahamad, Country Director of ActionAid Myanmar, Yangon, July 2016.

to the use of anticipatory capacity (or the preparation of vulnerable people through climate knowledge and early warnings) because this tends to adopt universalistic approaches to the nature of risk or of vulnerable people. Instead, evidence from this study suggests socio-economic drivers of risk and vulnerability tend to be overlooked. There is a need to look more critically at ToC processes in order to identify whether multiple and inter-connected ToCs in development interventions also include tacit models of risk or social transformation that are not given equal critical scrutiny (Bahadur & Tanner, 2014; Burton, 2009; Gidley et al., 2009; McEvoy et al., 2013).

Second, there is a continuing need to ensure that development outputs are not conflated with development outcomes in the field of resilience. Outputs can be short-term deliverables such as climate information that are justified by ToCs. Outcomes, however, are longer-term transitions towards development objectives (Funnell & Rogers, 2011; Valters, 2015). This study has suggested that concepts, pathways, and ToCs of resilience can all become boundary objects when they are adopted by diverse users with different objectives and modes of working. Under these conditions, different actors can claim to be achieving resilience when they are delivering different outputs. Being aware that resilience, and its pathways and ToCs, might become boundary objects is a first step to seeing how approaches to resilience might not always address diverse experiences and causes of risks.

The main challenge is that complex processes of development planning and collaboration can lead to the persistence of unhelpful assumptions. ToC processes therefore seem to be another field in which development narratives, or under-examined assumptions about cause-and-effect can continue within development practice (Hajer, 1995; Roe, 1991). Focusing on how ToCs remain unchallenged, or insufficiently inclusive, is a key way to make development interventions for resilience more useful and effective. In turn, this means asking more questions about ways to integrate resilience planning within social norms about how, and for whom, climatic events become hazardous (Pelling, 2011; O'Brien et al., 2012; Smit et al., 1999), and challenging development organizations to ensure that ToCs are useful for vulnerable groups (Faulkner et al., 2015).

8. Conflict of interest statement

The author confirms that this written work is the intellectual property of the author alone, and that this work presents no conflicts of interest.

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